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United States Department of Agriculture,

OFFICE OF THE SECRETARY.

U. S. DEPARTMENT OF AGRICULTURE,
Washington, D. C., December 10, 1900.

SIR: According to the provisions of the act of Congress, making appropriations for the Department of Agriculture for the fiscal year 1901, this Division was directed to purchase and collect seeds and specimens of valuable economic grasses and forage plants, to be distributed to the various experiment stations under the direction of the Secretary of Agriculture, to ascertain their adaptability to the various soils and climates of the United States.

In order to carry out this direction, plans were made early in the season to undertake the work with the beginning of the fiscal year. Mr. C. L. Shear, an assistant in the Division, was put in charge of the seed and field work, and immediately after July 1 he began work in the field, and several special agents were employed to work with him during the collecting season. He was verbally instructed to make the collection of seeds of valuable native grasses and forage plants the leading feature of his field work.

There are many native grasses and forage plants of great economic value that have never yet been introduced into cultivation. This is especially true of the grasses of the great cattle ranges of the West, which formerly grew in such abundance and which through overstocking and mismanagement have now become almost extinct. In the propagation and cultivation of these species, native to the soil and already acclimated, lies the hope of the ranchman and the herder for restoring to their former carrying capacity the now depleted ranges and pastures. Particular effort has been directed to securing in quantity seeds of these wild range grasses; also those of probable value in the South for winter pasturage, those likely to prove good meadow grasses for high altitudes and those especially adapted to binding shifting sands, for which there is so much demand.

Seeds of a few native grasses of highly economic importance have been obtained by purchase from parties living in the remote regions where they grow. A number of varieties were obtained in this way from the vicinity of Silver City, New Mexico. In all this work it not infrequently happened that long and tedious journeys had to be made to regions inaccessible to stock before grasses in seed could be found, and the collection was made by hand. Some four tons of seed of about one hundred and thirty varieties of grasses and forage plants were thus gathered, the quantities in each case varying from one to five hundred pounds. Never before has so large an amount of native seeds been collected by the Department. The results of the season's work of the Division in this direction are presented in Mr. C. L. Shear's report, which is submitted herewith for publication.

Respectfully,

F. LAMSON-SCRIBNER,
Agrostologist.

Hon. JAMES WILSON,
Secretary of Agriculture.

COLLECTION AND DISTRIBUTION OF GRASS SEED: FIELD WORK.

INTRODUCTION.

The soil and climatic conditions of different portions of our country are such that the plants which can be grown successfully in one place may prove an entire failure at some other point. For the Eastern and Southern United States the forage problems are much simpler than for the semiarid and mountainous regions of the West and Southwest. The conditions in the regions subject to prolonged drought make it impossible to grow without irrigation the grasses and forage plants so successfully cultivated in other parts of the country. There are, however, many valuable native grasses and forage plants found in these regions which have become adapted to the prevailing conditions. Experiments have already shown that some of these plants may be successfully and profitably introduced into cultivation, and further investigations will no doubt reveal others. The present deteriorated condition of the ranges and the increasing demand for winter forage shows the necessity of a thorough investigation of all plants which may be used in improving these conditions. The purposes in view have been to collect seeds, roots, and specimens for study and experimentation and to secure all the information possible regarding the forage conditions in the regions visited. Seeds and roots of valuable varieties adapted to the following conditions were sought particularly: Arid regions, alkali soils, subalpine and alpine regions, over-irrigated and seepage lands, and wet meadows. Collections were also made of grasses which gave promise of usefulness as soil or sand binders.

In prosecuting the field work the following persons were, by your recommendation, employed as special field agents: Prof. David Griffiths, Mr. Emil Lange, Mr. William Shear, and Mr. Elias Nelson. Besides these, the Chief of the Division and others of the force engaged in the work at various points during the season.

AREA COVERED AND APPRECIATION OF WORK.

Field work was carried on in Virginia, Massachusetts, Colorado, Wyoming, Montana, Idaho, Washington, Oregon, and Arizona.

Professor Griffiths and Mr. Lange worked in Montana, beginning at Billings. Later they proceeded to the Flathead Valley and spent about six weeks in the northwestern part of the State. They succeeded in securing a large quantity of seeds, roots, and specimens of many valuable native species and also important information relative to the forage conditions and needs of that region.

In his report to this office Professor Griffiths says:

There appeared to be a greater interest in the forage problem than I have ever seen manifested before. We found that the people with whom we came in con-

tact in our work were much more conversant with the efforts of the Department of Agriculture, and especially with those of the Division of Agrostology, than I had expected from my previous experience in the field. This increased interest appears due in part to the distribution of seed, but more especially to the distribution of publications of the Division and correspondence relative to experiments conducted. We found the ranchers and stockmen anxious to meet us and talk over our work and the forage question in general. They wanted publications and seeds for experiments. Even Bear Chief, at Family, Mont., wanted timothy seed sent to him. At Kalispell, Montana, especially we found an intelligent, lively interest in forage crops. Much material was brought in to us for identification at this point.

After finishing his work in Montana, Professor Griffiths proceeded to southern Arizona, where he has succeeded in securing a large amount of seed and a large and interesting collection of specimens of the more valuable range grasses of that region.

In Wyoming Mr. Elias Nelson made collections of seeds in the southeastern, southern, and southwestern portions of the State. He secured seeds and roots of the most valuable native forage plants of the arid and semiarid regions of that State, including a large quantity of seeds of the native saltbushes, which furnish so large a part of the forage of this region, especially during the winter.

Regarding the interest shown in the work of the Division by the stockmen and ranchmen of this region, we give the following quotation from Mr. Nelson's report:

Everywhere we were pleased to note how much the ranchmen appreciated the work of the Division, while others were glad to learn of the investigations which were being carried out. At other places a great interest was taken in our work and the ranchers were quite ready to facilitate it in any way. The work of the Division on forage plants for alkali soils has attracted considerable attention in some districts, and certain ranchers have been interested so far as to undertake to cultivate the native saltbushes. Many ranchmen who were situated on or near tracts of alkali land have come to recognize the forage value of the native saltbushes. The owner of a large pasture in which one of the saltbushes was the prominent vegetation, said that his cows mowed it off as if it were clover. The investigations of the Division along this line are of particular interest to the stock raisers having alkali lands under fence.

Mr. William Shear and myself carried on the work in Colorado. A large quantity of seeds and roots were collected in the Arkansas Valley, and also in the southern and southwestern portions of this State. The western wheat-grass, which is perhaps the most important native grass of the State, was found in great abundance along the right of way of the Atchison, Topeka, and Santa Fe Railroad at several points in the Arkansas Valley, especially at Rocky Ford. Owing to the slight increase of the normal amount of moisture which the grass received from irrigated lands on both sides it produced an abundant crop of seeds.

The very evident deterioration of the ranges and meadows of the Rocky Mountain region has compelled most of the stockmen and

ranchers to see the necessity of some efforts towards improving the present conditions, and we found the people interested in this work. Some have already undertaken experiments on their own account in cultivating the native meadow grasses or finding some means of improving the meadows. At Alamosa we talked with a gentleman who had tried various methods of improving his native meadows by harrowing and by sowing seeds collected from about stacks of native hay. This and other similar cases show that the people are interested and recognize the need of efforts to improve the present conditions.

Mr. A. B. Leckenby, who had charge of the work in Washington and Oregon, sent in over half a ton of various seeds secured at Walla Walla, Wash., along the Columbia River, and on the Pacific Coast near Morrison, Oreg. He obtained large quantities of several native grasses, especially range grasses and species adapted for use as sand and soil binders.

SEEDS OF NATIVE, OR WILD, GRASSES OBTAINED BY PURCHASE.

Besides the seeds collected by the agents and employees of the Division, a considerable quantity of native grass seed has been secured by purchase from persons living in localities where seeds of desired varieties could be secured. In this way seeds were procured from Michigan, Nebraska, Idaho, and southern New Mexico. The difficulties connected with the collecting, thrashing, and cleaning of native seeds makes the securing of them in quantity rather expensive. The grasses are rarely found in sufficient abundance to permit their being harvested in the ordinary manner, so that the harvesting has to be all done by hand, either cutting the heads with a sickle or, where the plants are scarce and much scattered, picking them separately.

A number of most excellent grasses are at present precluded from becoming generally introduced into cultivation or of commercial importance by reason of the great difficulties surrounding the thrashing, cleaning, and general manipulation of the seeds. Among these we may mention particularly the forms provided with long, rough, and troublesome awns, as the feather grasses, needle grasses, and beard grasses, and some of the wild ryes. Others are very troublesome on account of the cottony down with which the seed is surrounded. There is little doubt, however, that by the proper cultivation and selection of varieties some of these grasses may be so modified that the objectionable parts may be eliminated. We believe that experiments in this direction would prove very interesting and profitable, and that they should be undertaken at as early a date as possible.

COOPERATIVE SEED PRODUCTION.

In view of the large expenditure of time, labor, and money necessary to secure these seeds in the field, the difficulty of obtaining them in sufficient quantity for satisfactory experimentation, and the danger of losing valuable sorts entirely through insufficient care on the part of experimenters to whom the seed may be sent, it seems very desirable to make some permanent arrangements with the State experiment stations to the end that seed can be sent out in larger quantities to fewer points with the direct understanding that special attention be devoted to the production of seed for more general experimentation in the future, should the varieties prove worthy. The directors of a number of experiment stations have already expressed a desire to join in this work, and no doubt satisfactory arrangements could be made with all those who are especially interested in securing new and valuable grasses and forage crops. The first thing necessary in this work is to secure enough seed to demonstrate the value and adaptability of the various species. After this has been done seedsmen will naturally undertake their production, and those interested can secure supplies of seed through commercial sources.

RESULTS OF THE FIELD WORK.

As a result of the work in the field during the summer, seeds of about 130 varieties of grasses and forage plants were secured. These were obtained in quantities varying from 1 to 500 pounds according to the desirability of the species and the difficulty of securing it. The total amount collected was about 4 tons. Besides seeds, a considerable quantity of roots were obtained for transplanting; also several hundred specimens of interesting species for the herbarium or exhibition purposes.

Among the most important results of the field work is the information secured by direct observation and study of the actual conditions and problems to be met in the various regions, and by intercourse with the stockmen and ranchmen. This intercourse brings into actual touch the Department and those for whose immediate benefit the work is intended, and so promotes mutual understanding and profit. They come to a better understanding of the methods and aims of the Department, and we come to a better knowledge of their difficulties and needs.

VALUE OF THE WORK AND DESIRABILITY OF ITS CONTINUANCE.

From the experience already gained by trials of some of our native grasses and forage plants, it has been conclusively shown that there are great possibilities in the way of cultivation and improvement of these plants, and especially of those which are natives of the arid,

semiarid, and alkali regions of the West. Only continued and persistent efforts in this direction will, however, secure permanent and satisfactory results. The possibilities of any wild variety can not be thoroughly determined except by a long and careful series of experiments under varied conditions. There remain still other native species from more or less inaccessible areas in the West and Southwest which are no doubt worthy of investigation, and the efforts to secure and experiment with any of these forms which give promise of value in cultivation should be continued, and will, no doubt, finally add many valuable varieties to our present list of cultivated forage crops, not only for the West but for the whole country.

Similar explorations and investigations might very profitably be extended to our new Territories, which produce many forage plants worthy of broader dissemination and capable of improvement.

**SOME OF THE PARTICULARLY PROMISING PLANTS OF WHICH SEEDS WERE SECURED
IN QUANTITY.**

DRY MEADOW AND RANGE GRASSES.

Western wheat-grass (*Agropyron occidentale*).—This is a grass which gives promise of great value if it can be successfully cultivated. It is one of the most abundant and highly prized grasses of the Rocky Mountain States, thriving well upon very strong alkali soils as well as under very arid conditions. It is widely distributed throughout the West, and seeds were obtained by nearly all our field workers.

Bunch wheat-grass (*Agropyron spicatum*).—This is a most valuable and abundant grass on the ranges of the western slope of the Rockies and in Oregon and Washington. It has been grown for several seasons at Walla Walla, and has shown that it is easily adapted to cultivation. It grows luxuriantly with a very scanty supply of moisture and furnishes an abundance of most excellent hay. It gives great promise of usefulness for reseeded worn-out range lands.

Slender wheat-grass (*Agropyron tenerum*).—This is one of the native Western grasses which has already been introduced into cultivation and has proved successful in the East as well as the West. It is quite a variable species, and by proper selection of the better forms there is no doubt but that very valuable additions to our hay grasses can be secured from it.

Side-oats grama (*Bouteloua curtipendula*).—This is another very highly prized native species, providing a great amount of pasturage as well as hay, especially throughout the high plains from Dakota southward. The seeds which we obtained were from a particularly robust and luxuriant form. The few experiments already tried in cultivating this species indicate that it can probably be introduced into cultivation very successfully and profitably.

Blue grama (*Bouteloua oligostachya*).—A very luxuriant form of this species was found in the Arkansas Valley. From the few experiments already undertaken in cultivating this species, which is one of the most valuable range grasses of the plains and also the lower mountain ranges, it appears that this grass will prove equally valuable under cultivation for hay.

Short-awned brome (*Bromus marginatus*).—This is a very promising grass for cultivation for hay or pasture in situations where but a scanty supply of water can be secured. It frequently grows to a height of three or four feet, and has already been spoken of favorably by the ranchmen in eastern Oregon, who have tried it.

Mountain brome (*Bromus polyanthus paniculatus*).—This is a native brome of considerable promise often found growing wild from southern Colorado to Arizona and New Mexico. It grows luxuriantly in moist meadows and produces large crops of hay. It will also endure considerable drought.

Macoun's rye-grass (*Elymus macounii*).—This grass is one which grows naturally in arid, alkali soils, and is an excellent species for both hay and pasture. Its cultivation has never been attempted, but observations in the field lead to the belief that it may be successfully grown, especially under conditions similar to those in which it is found.

Red fescue (*Festuca rubra*?).—This is a very promising native plant of the northern and northwestern Rocky Mountains. It has been in cultivation for a year or two at Walla Walla, Wash., and has given indications of having much value. Sufficient seed has been grown to give it a thorough trial at one or more of the experiment stations. This is a native form, different in some respects from the plant sold under the same name by dealers.

Prairie June-grass (*Koeleria cristata*).—This grass is one of great value, not only on account of its broad distribution, as it ranges from the plains of eastern Nebraska and Kansas to near the summits of the Rockies, but also on account of its early appearance in the spring, for which it is highly prized by stockmen. It is about the first grass to furnish forage on the range in the early part of the season. It is not only valuable, however, for pasturage, but also produces, under favorable conditions of moisture, an excellent crop of hay of high nutritive value. As to its behavior under cultivation, only careful experiments will decide.

Sprangle-top (*Leptochloa dubia*).—From the few trials of this grass already made it seems probable that it will prove a very valuable addition to the meadow grasses of the South and Southwest. It produces with a comparatively small amount of moisture a heavy crop of excellent hay.

Alkali saccaton (*Panicum bulbosum*).—This grass has been grown in the grass garden at the Department for several years, and was grown last year on the Potomac Flats, near Washington. It has shown itself to be easily adapted to cultivation. It produces a very large amount of excellent and nutritious forage, and as it grows with a very slight amount of moisture, it gives promise of being one of the most valuable grasses yet secured for the South and Southwest.

Grapevine mesquite (*Panicum obtusum*).—This species is most abundant in New Mexico and Arizona, but is found in the southern part of Colorado, where it grows luxuriantly on some of the bottom lands, and produces a considerable amount of excellent hay, and if it can be successfully cultivated it will prove a valuable addition to the meadow grasses of the Southwest, especially for pasture.

Native blue-grass (*Poa* sp.).—This is one of the very valuable range and meadow grasses of the western slope of the Rockies, which gives promise of great value for cultivation in soils which are too dry to grow Kentucky blue-grass successfully.

Dropseed (*Sporobolus cryptandrus*).—This is another valuable native of the plains. We were fortunate enough to secure a good supply of seed of this from particularly thrifty and robust plants. It is a bunch grass, valuable not only for pasture, but also for hay, which is produced in abundance under favorable conditions. It thrives with very little moisture, and has a seed which is very easily harvested, all of which favors its introduction into cultivation.

WET MEADOW SPECIES.

Canadian rye-grass (*Elymus canadensis*).—This is a species which is sometimes objected to on account of the long awns on the seeds. It, however, grows

well under cultivation and produces a large amount of excellent hay and pasturage. By cultivation and selection of short-awned forms the objection which is sometimes raised on account of the awns, may be overcome.

Perennial rye-grass (*Elymus canadensis* var.).—This is a very robust form peculiar to the Southwest. It is spoken of very highly and appears worthy of careful trial. It is said to grow some every warm spell during winter and makes good hay. It does not require so much moisture as the common form and might, perhaps, with equal propriety be placed in the list of dry meadow species.

Manna grass (*Panicularia americana*).—This grass is particularly abundant and thrifty in very wet meadows or about sloughs and along streams, producing a great bulk of fairly good hay in such situations, and it may prove worthy of cultivation in places which can not be sufficiently drained to grow other species.

SOIL AND SAND BINDING SPECIES.

Beach grass (*Ammophila arenaria*).—Three hundred and twenty-five pounds of seed and a quantity of roots of this grass were collected near Provincetown, Cape Cod. It has been planted quite extensively on the Province Lands of Cape Cod by the State of Massachusetts and on the sandy shores of Europe for preventing the shifting of the sands. It can, no doubt, be successfully used for the same purpose in other localities. A sufficient quantity of seed has been secured to give it a thorough trial.

Indian millet (*Eriocoma cuspidata*).—This is one of the native bunch-grasses which is probably of most value for use in very sandy soils, for planting on railroad embankments and sand dunes, and in other situations where there is need of soil or sand binders. It has also been recommended for forage. Only thorough trial, however, will prove its possibilities in this direction.

Seaside blue-grass (*Poa macrantha*).—This grass, which is native along the Pacific coast and is particularly abundant on the sand dunes, was first secured on account of its value as a sand binder, but one or two seasons' experience with it has shown that it is probably also of considerable value as a hay and pasture grass in very sandy soils even in the interior. Seed has been secured in sufficient quantity to give the grass a thorough trial under various conditions in different parts of the country.

ALKALI-SOIL SPECIES.

Nuttall's saltbush (*Atriplex nuttallii*).—This is a very abundant species in strong alkali soils of the Red Desert of Wyoming and furnishes a considerable percentage of the forage of that region. It is regarded very highly by stockmen, especially for winter and early spring pasturage. The plant will endure much hard usage and severe trampling, and we see no reason why it may not thrive and improve under cultivation.

Forage saltbush (*Atriplex pabularis*).—Like the former, it is very abundant in strong alkali regions. It is a perennial, producing an abundance of green forage which is relished by both sheep and cattle. It is a very promising species for cultivation on strong alkali soils.

Several of the grasses mentioned under the heading of "Dry meadow and range species," might quite as properly come in this list, as they thrive in strong alkali soils. Of these, Western wheat-grass and Macoun's rye-grass may be particularly mentioned.

SUBALPINE SPECIES.

Mountain foxtail (*Alopecurus occidentalis*).—This is a rather rare grass, restricted in its distribution to wet meadows in the mountain regions of Montana, Idaho, and farther north. It grows luxuriantly, producing a large quantity of

excellent hay, and if it can be successfully cultivated will no doubt prove valuable for cold, wet meadows of mountainous regions. The woolly character of the glumes enclosing the seed makes their manipulation rather difficult.

Mountain rye-grass (*Elymus glaucus*).—This grass is abundant, especially in higher altitudes, on subalpine, sparsely wooded slopes and in cleared places, where it grows very thrifty, producing a large amount of excellent forage. It gives promise of considerable value for cultivation in mountainous regions, and may also succeed well in lower altitudes.

LIST OF SPECIES AND VARIETIES OF WHICH SEEDS WERE SECURED, AND THE PLACES FROM WHICH THEY CAME.

[The Latin name is followed by the English name, when any is known.]

- Agropyron caninum*, Bearded wheat-grass; from Montana.
 var., Bearded wheat-grass; from Washington State.
coeruleum, Blue wheat-grass; from Washington, D. C.¹
dasystachyum subvillosum, Downy wheat-grass; from Wyoming.
occidentale, Western wheat-grass; from Colorado, Wyoming, Montana, Washington State.
richardsoni, Richardson's wheat-grass; from Montana.
riparium, Riparian wheat-grass; from Wyoming.
spicatum, Bunch wheat-grass; from Washington State.
spicatum inermis, Bunch wheat-grass; from Washington State.
tenerum, Slender wheat-grass; from Colorado, Wyoming, Montana, Washington State.
 vaseyi? Vasey's wheat-grass; from Wyoming.
 violaceum, Violet wheat-grass; from Montana.
- Agrostis exarata*, Northern red-top; from Montana.
Alopecurus occidentalis, Mountain foxtail; from Montana.
Ammophila arenaria, Beach grass; from Massachusetts.
Andropogon provincialis furcatus, Blue beard-grass; from Washington, D. C.
 nutans, Bushy beard-grass; from Washington State.
 torreyanus, Feather beard-grass; from Arizona.
- Aristida bromoides*, Brome triple-awn; from Arizona.
 humboldtiana, Humboldt's triple-awn grass; from Arizona.
- Arrhenatherum elatius*, Tall oat grass; from Washington State.
Astragalus crassicaulus, Ground plum; from Montana.
Atriplex argentea, Silvery saltbush; from Wyoming.
 canescens, Shad scale; from Wyoming.
 confertifolia, Spiny saltbush; from Wyoming.
 eremicola, Desert saltbush; from Wyoming.
 halimoides, Gray saltbush; from Washington, D. C.
 holocarpa, Annual saltbush; from Washington, D. C.
 nuttallii, Nuttall's saltbush; from Wyoming.
 pabularis, Forage saltbush; from Wyoming.
 semibaccata, Australian saltbush; from Washington, D. C.
 truncata, Utah saltbush; from Wyoming.
 volutans, Tumbling saltbush; from Wyoming.
- Beckmannia erucaeformis*, Slough grass; from Colorado, Montana.
Bouteloua bromoides, Brome grama; from Arizona.
 curtipendula, Side-oats grama; from Colorado, Washington, D. C.
 oligostachya, Blue grama; from Arizona.
 polystachya, Low grama; from Arizona.

¹ Seed from Washington, D. C., was raised in the grass garden on the grounds of the Department or on the experimental grounds on the Potomac Flats.

- Bromus ciliatus*, Swamp chess; from Washington, D. C.
carinatus hookerianus, Hooker's brome; from Washington State.
inermis, Smooth brome; from Washington State.
marginatus, Short-awned brome; from Wyoming, Montana, Idaho.
 var., Short-awned brome; from Washington State.
polyanthus paniculatus, Mountain brome; from Colorado, New Mexico.
porteri, Porter's brome; from Colorado.
pumpellianus, Western brome; from Washington, D. C.
racemosus, Racemed chess; from Washington, D. C.
richardsoni, Richardson's brome; from Montana.
richardsoni pallidus, Richardson's brome; from Montana.
unioloides, Rescue grass; from Washington State.
vulgaris, Common brome; from Montana.
- Calamagrostis aleutica*, Aleutian blue-joint; from Washington State.
 canadensis var., Canadian blue-joint; from Wyoming.
 hyperborea americana, Northern blue-joint; from Montana.
- Chaetochloa composita*, Arizona millet; from Arizona.
 italica, Common millet; from Washington, D. C.
- Chloris elegans*, Elegant chloris; from Arizona.
- Cicer arietinum*, Chick pea; from Washington State.
- Dactyloctenium australiense*, Button-grass; from Washington, D. C.
- Deschampsia caespitosa*, Tufted hair-grass; from Wyoming.
- Desmodium sp.*, Beggar weed; from Arizona.
- Eatonia obtusata*, Blunt eatonia; from Wyoming.
- Eleusine coracana*, African millet; from Washington State.
- Elymus canadensis*, Canadian rye-grass; from Colorado, Montana, Washington State.
 var., Perennial rye-grass; from New Mexico.
 glaucofolius, Smooth rye-grass; from Washington State.
condensatus, Giant rye grass; from Montana.
glabriflorus, Smooth-leaved rye-grass; from Texas.
glaucus, Mountain rye-grass; from Montana.
macounii, Macoun's rye-grass; from Colorado, Montana, Wyoming.
simplex, Alkali rye-grass; from Wyoming.
virginicus submuticus, Short-awned rye-grass; from Washington, D. C., and Washington State.
- Eriocoma cuspidata*, Indian millet; from Colorado, Wyoming, Washington State.
- Eurotia lanata*, Winter fat; from Arizona.
- Festuca arundinacea*, Reed fescue; from Washington State.
 elatii pratensis, Meadow fescue; from Washington State.
 kingii, King's fescue; from Washington State.
 ovina, Sheep fescue; from Montana.
 rubra, Red fescue; from Washington State.
 thurberi, Thurber's fescue; from Colorado.
- Gastridium australicum*, Nit-grass; from Washington State.
- Glycine hispida*, Soy bean; from Washington, D. C.
- Hilaria cenchroides*, Curly mesquite; from Washington, D. C.
 mutica, Black mesquite; from Colorado.
- Keoheria cristata*, Prairie June grass; from Wyoming.
- Lathyrus sativa*, Bitter flat pea; from Washington State.
- Leptochloa dubia*, Sprangle-top; from New Mexico.
- Medicago denticulata*, Bur clover; from Washington State.
 sativa Turkestanica, Turkestan alfalfa; from Washington State.
 sativa var., Oasis alfalfa; from Washington State.

- Melica altissima*, Tall melic; from Washington State.
Mucuna utilis, Velvet-bean; from Washington, D. C.
Muhlenbergia racemosa, Wild timothy; from Washington State.
 gracilis, Slender wild timothy; from Arizona.
Panicum bulbosum, Alkali saccaton; from Washington, D. C., New Mexico.
 var., Alkali saccaton; from New Mexico.
 crus-galli, Japanese barnyard millet; from Washington, D. C.
 muticum, Beardless barnyard millet; from Washington, D. C.
 obtusum, Grapevine mesquite; from Colorado.
Panicularia americana, American manna; from Colorado, Wyoming, Montana.
Paspalum dilatatum, Large water-grass; from Washington, D. C.
 compressum, Carpet grass; from Washington, D. C.
Pappophorum apertum, Open wool-grass; from Arizona.
Phalaris arundinacea, Reed canary-grass; from Wyoming, Montana, Washington State.
Phaseolus retusus, Metcalfe's bean; from Texas, New Mexico.
Phleum alpinum, Alpine timothy; from Montana.
Pisum arvense, Field pea; from Washington State.
Poa buckleyana, Buckley's blue-grass; from Montana.
 fendleriana, Fendler's " " New Mexico.
 laevigata, Smooth blue-grass; from Washington State.
 lucida, Shining blue-grass; from Montana.
 macrantha, Seaside blue-grass; from Washington State.
 nevadensis, Nevada " " "
 wheeleri, Wheeler's " " "
 pratensis var., Kentucky blue-grass; from Montana.
Poterium sanguisorba. Burnet.
Puccinellia airoides, Alkali meadow-grass; from Wyoming.
Rumex patientia? Mountain dock; from Montana.
Sporobolus airoides, Alkali fine top; from Wyoming.
 cryptandrus, Dropseed; from Colorado, Arizona.
 depauperatus, Steel-grass; from Wyoming.
 wrightii, Saccaton; from Arizona.
 var., Saccaton; from Arizona.
Stipa vaseyi, Vasey's needle-grass; from Colorado.
 viridula, Green " " Wyoming, Montana.
 sp., Metcalfe's " " New Mexico.
Vicia americana, American vetch; from Montana.
 maritima, Seaside vetch; from Washington State.
Vigna catjang, Cow pea; from Washington, D. C.

C. L. SHEAR,

In Charge of Seed and Field Work.

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